IQgig-5G™ Model B
5G mmWave Test System

LITEPOINT

Overview

The IQgig-5G is a fully-integrated, non-signaling solution for testing 5G mmWave products. All signal generation, analysis, and RF front-end routing hardware are self-contained inside a single chassis. The IQgig-5G has over 1.4 GHz of instantaneous bandwidth, supporting all 3GPP carrier aggregation test cases. The IQgig-5G solution contains a Vector Signal Generator (VSG) and Vector Signal Analyzer (VSA) and can be configured with either two or four bi-directional source and measurement ports, each with 2.4 mm connector coaxial interface. The VSG and VSA can be tuned independently to different frequencies over the entire specified frequency range. Each RF port can be switched on-the-fly to the internal VSG or VSA.

The IQgig-5G is the simplest solution for testing 5G mmWave products as all the required hardware is self-contained inside a single chassis, enabling the source and measure capabilities to be calibrated at the instrument front panel. This full hardware integration significantly reduces the test set up complexity and improves efficiency yielding the following benefits:

• Simplest test fixture set up with direct connection to the calibrated front panel interface

• Fully-integrated and calibrated – make high performance mmWave measurements in minutes instead of hours

• Seamless transition from the lab to the manufacturing floor

Port Descriptions

Front Panel

4-port

2-port

I/O	Function	Type
Power Button	Power On/Off	Pushbutton Switch
Power Indicator	LED solid red – test system is in standby mode LED blinking red – test system is powering off LED blinking green – test system is booting up LED solid green – test system is powered on	LED indicator
Session Active Indicator	LED Green – remote session active LED Red – remote session lock	LED indicator
Status Indicator	LED Green – no faults/errors detected LED Orange – Software error detected LED Red – Hardware fault detected	LED indicator
RF1 Indicator	LED green – port is a VSA input LED red – port is a VSG output	LED indicator
RF2 Indicator	LED green – port is a VSA input LED red – port is a VSG output	LED indicator

I/O	Function	Type
RF3 Indicator	LED green – port is a VSA input LED red – port is a VSG output	LED indicator
RF4 Indicator	LED green – port is a VSA input LED red – port is a VSG output	LED indicator
LINK1 Indicator	LED green – LINK1 connected	LED indicator
LINK2 Indicator	LED green – LINK2 connected	LED indicator
RF1	VSA input or VSG output	2.4mm female
RF2	VSA input or VSG output	2.4mm female
RF3	VSA input or VSG output	2.4mm female
RF4	VSA input or VSG output	2.4mm female

Rear Panel
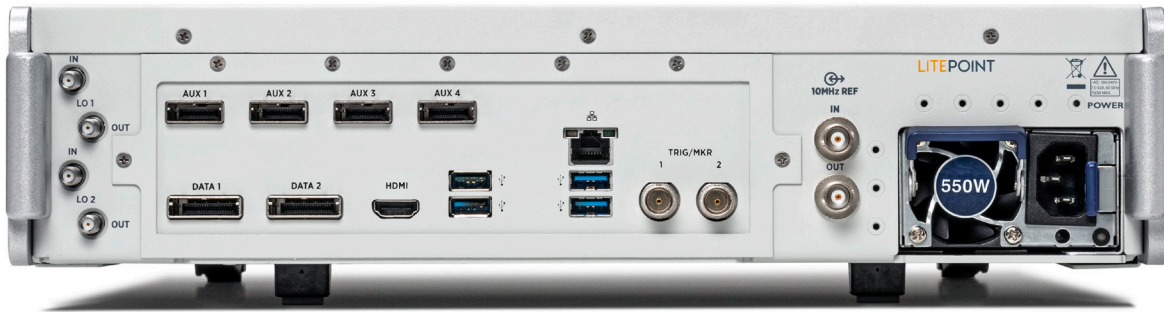
I/O	Function	Type
10 MHz REF IN	10 MHz reference input	BNC female
10 MHz REF OUT	10 MHz reference output	BNC female
TRIG/MKR 1	TTL Trigger Input / Output	BNC female
TRIG/MKR 2	TTL Trigger Input / Output	BNC female
LO1 IN	LO1 Input	SMA female
LO1 OUT	LO1 Output	SMA female
LO2 IN	LO2 Input	SMA female
LO2 OUT	LO2 Output	SMA female
USB (4 ports)	USB 3.0 compatible connection to external controller	USB Type A
HDMI	Video Output	HDMI
LAN	1000 Base-T LAN	RJ-45
DATA 1	DATA 1 Connection	iPass PCIe x4
DATA 2	DATA 2 Connection	iPass PCIe x4
AUX 1	General Purpose I/O	iPass
AUX 2	General Purpose I/O	iPass
AUX 3	General Purpose I/O	iPass
AUX 4	General Purpose I/O	iPass

General Hardware Specifications

Vector Signal Analyzer (VSA)

Parameters	Value
Frequency Range	23 GHz – 45 GHz
Center Frequency Resolution	1 kHz
Frequency Settling Time (to 0.1 ppm)	<10ms
Maximum Capture Bandwidth	1.7 GHz
Maximum Input Power	+20 dBm (CW)
Input Power Accuracy	±1.5 dB (+20 to -55 dBm) (CW) ±2.5 dB (-55 to -70 dBm) (CW)
Input Power Measurement Repeatability	0.1 dB at ≥ -40 dBm
Reference Level Range	+20 to -70 dBm
Digitizer Resolution	12 bits
Digitizer Sampling Rate	2.4576 GS/s
Waveform Capture Duration	50 ms
Spurious (signal applied)[1]	< -40 dBc or -70 dBm, whichever is higher, 1 MHz RBW
Image Rejection[1]	< -45 dBc (CW)
Inherent Spurious Floor[1] (no signal applied)	≤ -80 dBm at minimum attenuation, 1 MHz RBW
Carrier Leakage	< -35 dBc
Spectral Flatness[1]	≤ 2.0 dB peak to peak
Integrated Phase Noise	< 0.7 degrees (10 kHz to 10 MHz)
Noise Figure (at minimum input attenuation)	≤ 22 dB, ≤ 30 GHz ≤ 24 dB, > 30 - 43 GHz

Vector Signal Generator (VSG)

Parameters	Value
Frequency Range	23 GHz – 45 GHz
Center Frequency Resolution	1 kHz
Maximum Modulation Bandwidth	1.7 GHz
Output Power Range	+10 to -70 dBm (CW) 23 GHz – 40 GHz +5 to -70 dBm (CW) > 40 GHz – 43 GHz
Output Power Accuracy	±1.5 dB, ≤40 GHz, signal level ≥ -40 dBm (CW) ±2 dB, >40 GHz – 43 GHz, signal level ≥ -40 dBm (CW) ±2.5 dB, ≤43 GHz, signal level < -40 dBm to -70 dBm (CW)
Level Settling Time	< 1 ms to 0.1 dB
Generator Resolution	14 bits
Generator Sampling Rate	2.4576 GS/s
Waveform Playback Duration	200 ms
Spectral Flatness[1]	≤ 2.0 dB peak to peak[2]
Spurious (in band)[3]	< -40 dBc or -70 dBm, (CW) whichever is higher
Spurious (out of band)	< -20 dBc or -70 dBm, (CW) whichever is higher
Carrier Leakage	< -30 dBc (CW)
Image Rejection[3]	< -40 dBc (CW), <42.5 GHz center frequency Output Power ≤-10dBm
Integrated Phase Noise	< 0.7 degrees (10 kHz to 10 MHz)

1 Measured in 800 MHz modulation bandwidth
2 Flatness measured at 0 dBm (≤40 GHz), at -5 dBm (>40 GHz to ≤42.5 GHz)
3 Measured in 1.5 GHz modulation bandwidth

Timebase

Parameters	Value
Oscillator type	OCXO
Frequency	10 MHz
Initial accuracy (25°C, after 60 minute warm-up)	< +/- 0.05 ppm
Maximum aging	< +/- 0.1 ppm per year
Temperature stability	< +/-0.05 ppm over °C to 50°C range, referenced to 25°C
Warm-up time (to within ±0.1ppm at 25°C)	60 minutes

General and Environmental

Parameter	Description
Dimensions	14.5" W x 3.2" H x 20.5" D (368 mm x 82 mm x 521 mm)
Weight	28 lb (12.7 kg)
Power consumption (maximum)	300W
Power consumption (average)	225W
Power requirements	100 - 240 VAC, 50-60 Hz
Supported browsers	Google Chrome, Mozilla Firefox
Operating temperature	+10°C to +50°C
Storage temperature	-20°C to +70°C (IEC EN60068-2-1, 2, 14)
Specification validity temperature	20°C to 35°C (valid range for specifications)
System warm-up time	60 minutes
Operating humidity	15% to 95% relative humidity, non-condensing (IEC EN60068-2-30)
EMC	EN61326-1 Class A, EN55011
EMI (Immunity)	EN61000-4
Safety	IEC 61010-1, EN61010-1, UL61010-1:2012 and CAN/CSA-C22.2 No. 61010-1-12
Mechanical vibration	IEC 60068-2-6 for Sine Vibration and MIL-STD 810G for Random Vibration
Mechanical shock	ASTM D3332-99
Recommended connector torque	8 lb-in (90 N-cm)
Recommended calibration cycle	12 months
Warranty	12 months hardware, 12 months software updates

5G NR Measurements

Measurement	TS 38.101-2 Paragraph Reference	Notes
Transmit Power	6.2	Maximum Power
Output Power Dynamics	6.3	Min Power Relative Power On/Off Time Mask
Transmit Signal Quality	6.4	Frequency Error EVM Carrier Leakage In-Band Emissions
Output RF Spectrum Emissions	6.5	Occupied Bandwidth Spectrum Emission Mask ACLR
Receiver Sensitivity	7.3	Reference Sensitivity Power
Receiver Level	7.4	Maximum Input Level
Receiver Blocking	7.5	Adjacent Channel Selectivity (Characterization only, no recommended for manufacturing. Requires additional signal generator)
	7.6	In-Band Blocking (Characterization only, no recommended for manufacturing. Requires additional signal generator)

5G NR Measurement Specifications

Measurement	Performance
Maximum output power	See general H/W specifications
Minimum output power	See general H/W specifications
Transmit off power	See general H/W specifications
Frequency error	See timebase specifications
Residual EVM (Typical)[1]	5G NR 1x100 MHz CC: <0.8% (-42 dB), ≥ 24.25GHz - ≤ 40 GHz @ -10 dBm 5G NR 1x400 MHz CC: <1.1% (-39 dB), ≥ 24.25GHz - ≤ 40 GHz @ -10 dBm 5G NR 8x100 MHz CC: <1.8% (-35 dB), ≥ 24.25GHz - ≤ 40 GHz @ -10 dBm
Carrier leakage	See general H/W specifications
Occupied bandwidth	See general H/W specifications
ACLR	See general H/W specifications
Spectrum emission mask	See general H/W specifications
Spurious emissions	Limited to 23 GHz – 45 GHz
Reference sensitivity	DUT support required
Maximum input level	DUT support required

1 Measured in system loopback with LO offset and 5G NR waveform with mu=3, CP-OFDM, 256 QAM

Order Codes

Code	Product
0100-IG5G-011	IQgig-5G Model B Test System, 4 port version
0100-IG5G-013	IQgig-5G Model B Test System, 2 port version
0300-IG5G-003	3GPP NR 5G Software License
0150-IG5G-102	mmWave Test Chamber for 5G, 24 to 43.5 GHz. Includes a 2-axis DUT rotator and flexible antenna mounting system for multiple antennas and angles.

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